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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/580,557	LIU, BENJAMIN	
	Examiner	Art Unit	
	JONATHAN WILLIS	2441	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 January 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13, 15-19, 21, and 23-39* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13,15-19,21 and 23-39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *01/28/2010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

2. Applicant's submission filed on 11//24/2008 has been entered. Claims 1, 6-11, 15, 18-19, 21, 23-26, and 32 have been amended. Claims 14, 20, and 22 are cancelled. Claims 1-13, 15-19, 21, and 23-39 are pending examination.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 1-3, 6-8, 11-12, and 18-19 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bantz (US2006/0107269) in view of US2004/0167996 A1 to Takamura et al. (hereinafter referred to as Takamura).

5. In regard to claim 1, **Bantz** teaches a method for a client platform coupled to a server platform via a network (*see client coupled to server via network,* **in Fig. 3 [101] [104]**) comprising:

determining (*e.g. "recognized,"* **in [0006] Line 3**) that an input/output operation (*e.g. "plugged in,"* **in [0006] Lines 2-3**) related to an input/output device (*e.g. "devices local to the user to be "plugged in", recognized,"* **in [0006] Lines 2-3**) happens during execution of an application on a virtual machine (*e.g. "devices local to the user to be "plugged in", recognized, and made available to the user while executing on the remote virtual machine,"* **in [0006] Lines 2-4**), but

Bantz does not explicitly teach that

the virtual machine is run on the client platform; and

requesting the server platform via the network to handle the input/output operation related to the input/output device through a client network interface of the client as claimed.

However, **Takamura** teaches

the virtual machine (*see guest operating system ran in client,* **in Fig. 2 [122]**, *e.g. "The startup processing 320 is called when the client computer 101 is started and it activates the hypervisor and the OS,"* **in [0045] Lines 4-6**) is run on the client platform (*see "Client Computer,"* **in Fig. 1 [101]**); and

requesting the server platform (*see "Server Computer,"* **in Fig. 1 [102]**) via the network (*see "Network,"* **in Fig. 1 [103]**) to handle an input/output operation related to

an input/output device through a client network interface (*see "Network Interface Adaptor,"* **in Fig. 1 [902]**) of the client (e.*g. "hypervisor of the client computer…for detecting an access to an I/O device of the server computer…and…transmitting a command to the I/O device of the server computer….A hypervisor of the server computer…which receives the command to the I/O device from the network, and issues the command to the I/O device,"* **in [0010] Lines 4-14**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to add the feature of running a Virtual Machine Monitor (VMM)/Hypervisor in a client computer to detect I/O requests that need to be handled by the Hypervisor of a host systems, as disclosed in **Takamura**, into the teachings of **Bantz**, since both reference are directed toward I/O operations of virtual devices, hence would be considered to be analogous based on their related fields of endeavor.

One would be motivated to do so as **Takamura** discloses the need for compatibility between Client/Server I/O operation where different Operating Systems are being utilized on their respective platforms (*e.g. "there is a problem that in a computer system comprising a server computer and a client computer, connected via a network, when an OS of the server computer and an OS of the client computer are different from each other, an I/O device connected to the server computer cannot be used from the client computer,"* **from Takamura in [0008]**), as **Bantz** is also concerned about compatibility of remote Virtual Machines running I/O devices in a Client/Server system (e.*g. "Normally, the virtual machine can only operate using devices that are local to that virtual machine itself, and the local user is forced to use only those devices that*

are currently installed on that virtual machine," **from Bantz in [0003]**), and incorporating **Takamura** into **Bantz** could enhance **Bantz** by allowing client's to use I/O devices that are not installed on a Virtual Machine being executed by a client (*e.g. "to allow the client computer to use an I/O device connected to the server computer, without changing the operating systems on any of the server computer and the client computer, even when those operating systems are different from each other,"* **from Takamura in [0009]**), by enabling non compatible I/O requests at remote locations.

6. In regard to claim 2, **Bantz-Takamura** teaches the method of claim 1, wherein the request (e.g. "*find out if support for that particular device exists on the server,"* **from Bantz in [0028] Lines 3-4**), comprises a server platform identifier to identify the server platform (*see inherent identification of server platform in connection of client to the server,* **from Bantz in Fig. 3 [101] [104]**).

7. In regard to claim 3, **Bantz-Takamura** teaches the method of claim 1, wherein the request (e.g. "*find out if support for that particular device exists on the server,"* **from Bantz in [0028] Lines 3-4**) comprises a device module identifier to identify a device module (e.*g. "gathers the information about the device such as the device model number and type, and sends that information to the virtual machine instance in server,"* **from Bantz in [0027] Lines 5-8**) from a plurality of device modules (s*ee inherent searching through multiple device drivers*, *e.g. "the device driver to be located*," **from Bantz in [0006] Line 7**) in the server platform to handle the input/output operation

related to the input/output device (*e.g. "find out if support for that particular device exists on the server…If not, the virtual machine instance in the server initiates the installation of a physical device driver in the server,"* **from Bantz in [0028] Lines 3-6**), wherein the device module corresponds to the input/output device (e.*g. "information about the device such as the device model number and type,"* **from Bantz in [0027] Lines 5-8**).

8. Claims 6-8 are corresponding machine readable storage medium claims (*see "HDD,"* **in Fig. 1 [903] [913],** *e.g. "In the HDD 903, there are stored an application program 121, an operating system 122, a hypervisor 123, and a boot loader 124,"* **from Takamura in [0028]**) of method claims 1-3; therefore, they are rejected under the same rational.

9. Claims 18-19 are corresponding machine readable storage medium claims (*see "HDD,"* **in Fig. 1 [903] [913],** *e.g. "In the HDD 903, there are stored an application program 121, an operating system 122, a hypervisor 123, and a boot loader 124,"* **from Takamura in [0028]**) of method claims 11-12; therefore, they are rejected under the same rational.

10. Claim 32 recite limitations substantially the same as the limitations of claims 1 and 11; therefore, they are rejected under the same rational.

11. Claims 4-5, 9-10, 15-17, 23-31 and 35-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bantz-Takamura in view of US 4,860,190 to Kaneda et al. (hereinafter referred to as Kaneda).

12. In regard to claim 4, **Bantz-Takamura** teaches the method of claim 1, further comprising:

receiving a feedback for the input/output operation (*e.g. "the device to be detected locally,"* **from Bantz in [0006] Lines 6-8**) from the server platform through the network (*see installation as feedback, e.g. "downloaded, and installed to the virtual machine,"* **from Bantz in [0006] Lines 6-8**), but

Bantz-Takamura does not teach the feedback comprising a virtual machine identifier to identify the virtual machine in the client platform that is executing the input/output operation; and sending the feedback to the virtual machine identified by the virtual machine identifier as claimed.

However, **Kaneda** teaches the feedback comprising a virtual machine identifier (e.g. "receives the identification number," **in Col. 6, Line 1**) to identify the virtual machine in the client (e.g. "*computer system,"* **in Col. 1, Lines 63-65**) platform that is executing the input/output operation (e.g. "*computer system for controlling virtual machines, each machine given a different identification number,"* **in Col. 1, Lines 63-65**); and

sending the feedback to the virtual machine identified by the virtual machine identifier (*e.g. "to control the virtual machines and to decide which virtual*

machine will receive the control right of the CPU. The VM monitor assigns the identification numbers for the virtual machines," **in Col. 5, Lines 55-59**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to add the feature of multiple virtual machines with different identification numbers as disclosed in **Kaneda** into the teachings of **Bantz-Takamura** since all of the references are directed to virtual machine operating system environments, hence, would be considered to be analogous based on their related fields of endeavor.

One would be motivated to do so in order to specify which virtual machine running on the client is to receive feedback, as it should be obvious to one of ordinary skill in the art to recognize that some sort of identification is necessary when transferring data in a network to a particular endpoint that has a plurality of equivalent environments for that endpoint, as Takamura also discloses the use of multiple guest Operating Systems in as single computer platform (e.g. "*In an actual computer system, however, there are many cases that such an OS-based I/O device virtualization function is unusable. This is because the I/O device virtualization function is available only between identical operation systems, in many occasions, and further, a plurality of types of OS are mixed in one computer system in general,"* **from Takamura in [0007]**).

13. In regard to claim 5, **Bantz-Takamura** teaches the method of claim 1, and receiving instructions via the network (*e.g. "Mouse movements are tracked at the user's local machine and sent to the remote virtual machine via the network,"* **from Bantz in**

[0010] Lines 5-7), and a device module of the server platform (e.g. "*The device information is used to…find out if support for that particular device exists on the server,*" **from Bantz in [0027] Line 7 – [0028] Line 4**), but

Bantz-Takamura does not teach the method further comprising:

receiving an interrupt instruction issued by a device module, the interrupt instruction comprising a virtual machine identifier to identify a virtual machine to perform the interrupt instruction; and

Injecting the interrupt instruction into the virtual machine identified by the virtual machine identifier

However, **Kaneda** teaches the method further comprising:

receiving an interrupt instruction (*e.g. "if an interrupt request is in that port, an I/O interrupt for the VM monitor of the real machine will be generated,"* **in Col. 4, Lines 20-22**) issued by a device module (*e.g. "I/O interruption queue,"* **in Col. 4, Line 19**), the interrupt instruction comprising a virtual machine identifier (*e.g. "identification number,"* **in Col. 6, Line 1**) to identify a virtual machine to perform the interrupt instruction (*e.g. "By this handling routine…it is determined which virtual machine has issued the I/O instruction which caused the I/O interrupt,"* **in Col. 6, Lines 40-43**); and

Injecting the interrupt instruction (*e.g. "By this handling routine," in Col. 6, Line 40*) into the virtual machine identified by the virtual machine identifier (*e.g. "By this handling routine…it is determined which virtual machine has issued the I/O instruction which caused the I/O interrupt,"* **in Col. 6, Lines 40-43**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to combine **Bantz-Takamura** with **Kaneda** for reasoning set forth above in claim 4.

14. Claims 9-10 are corresponding machine readable storage medium claims (*see "HDD,"* **in Fig. 1 [903] [913],** *e.g. "In the HDD 903, there are stored an application program 121, an operating system 122, a hypervisor 123, and a boot loader 124,"* **from Takamura in [0028]**) of method claims 4-5; therefore, they are rejected under the same rational.

15. In regard to claim 11, **Bantz** teaches a method for a server platform coupled to a client platform via a network (*see client coupled to server via network,* **in Fig. 3 [101] [104]**),

receiving, from the client platform via the network, a request for an input/output operation related to an input/output device (*see sending and receiving via network,* **in Fig. 1**, *e.g. "sends that information to the virtual machine instance in server…The device information is used to…find out if support for that particular device exists on the server,"* **in [0027] Line 7 – [0028] Line 4**) by a server network interface of the server platform (*see output sent to client device through inherent server interface, e.g. "The output is then routed to the actual printer 103 through the network connection and the virtual device hub 102,"* **in [0029] Lines 9-10**); and

identifying a device module (e.g. "*downloaded, and installed to the virtual machine,"* **in [0006] Lines 6-8**) from a plurality of devices modules in the server platform to handle the request (e.g. "*find out if support for that particular device exists on the server,"* **in [0027] Line 7 – [0028] Line 4**), the identified device module (e.g. "*downloaded, and installed to the virtual machine,"* **in [0006] Lines 6-8**) corresponding to the input/output device related to the input/output operation (*e.g. "the device to be detected locally, the device driver to be located, downloaded, and installed to the virtual machine,"* **in [0006] Lines 6-8**);

obtaining a result (*e.g. "recognized,"* **in [0006] Line 3**) for the input/output operation (*e.g. "the device to be detected locally,"* **in [0006] Lines 6-8**) from the identified device module (e.g. "*downloaded, and installed to the virtual machine,"* **in [0006] Lines 6-8**);

constructing a feedback with the result (*see installation as feedback, e.g.* "*downloaded, and installed to the virtual machine,"* **in [0006] Lines 6-8**); and

sending the feedback (*see installation as feedback, e.g.* "*downloaded, and installed to the virtual machine,"* **in [0006] Lines 6-8**) from the server platform to the client platform through the network *(see communication from server to client through network*, **in Fig. 1**), but

Bantz does not teach a virtual machine identifier to identify a virtual machine in the client platform that is executing an application when the input operation happens as claimed.

However, **Takamura** teaches

the virtual machine (*see guest operating system ran in client,* **in Fig. 2 [122]**, *e.g. "The startup processing 320 is called when the client computer 101 is started and it activates the hypervisor and the OS,"* **in [0045] Lines 4-6**) is run on the client platform (*see "Client Computer,"* **in Fig. 1 [101]**), and

Kaneda teaches a virtual machine identifier (e.g. "*identification number,"* **in Col. 1, Lines 63**) to identify a virtual machine in the client (e.g. "*computer system,"* **in Col. 1, Lines 63-65**) platform that is executing the input operation (e.g. "*computer system for controlling virtual machines, each machine given a different identification number,"* **in Col. 1, Lines 63-65**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to add the feature of running a Virtual Machine Monitor (VMM)/Hypervisor in a client computer to detect I/O requests that need to be handled by the Hypervisor of a host systems, as disclosed in **Takamura** and virtual machine identification numbers as disclosed in **Kaneda,** into the teachings of **Bantz** since all of the references are directed to virtual machine operating system environments, Hence, would be considered to be analogous based on their related fields of endeavor.

One would be motivated to do so in order to specify which virtual machine running on the client is to receive feedback, as it should be obvious to one of ordinary skill in the art to recognize that some sort of identification is necessary when transferring data in a network to a particular endpoint that has a plurality of equivalent environments for that endpoint, and incorporating **Takamura** into **Bantz** could enhance **Bantz** by allowing client's to use I/O devices that are not installed on a Virtual Machine being

executed by a client (*e.g. "to allow the client computer to use an I/O device connected to the server computer, without changing the operating systems on any of the server computer and the client computer, even when those operating systems are different from each other,"* **from Takamura in [0009]**), by enabling non compatible I/O requests at remote locations.

16. In regard to claim 12, **Bantz-Takamura-Kaneda** teaches the method of claim 11, wherein the request (e.g. "*find out if support for that particular device exists on the server,"* **from Bantz in [0028] Lines 3-4**) comprises a device module identifier (e.*g. "gathers the information about the device such as the device model number and type, and sends that information to the virtual machine instance in server,"* **from Bantz in [0027] Lines 5-8**) to identify the device module in the server platform device (*e.g. "find out if support for that particular device exists on the server…If not, the virtual machine instance in the server initiates the installation of a physical device driver in the server,"* **from Bantz in [0028] Lines 3-6**).

17. In regard to claim 15, **Bantz-Takamura-Kaneda** teaches the method of claim 14, wherein the feedback (*see installation as feedback, e.g. "downloaded, and installed to the virtual machine,"* **from Bantz in [0006] Lines 6-8**) further comprise a client platform identifier to identify the client platform that has sent the request (*see inherent client identifier to install the device driver on the virtual machine, e.g. "downloaded, and installed to the virtual machine,"* **from Bantz in [0006] Lines 6-8**).

18. In regard to claim 16, **Bantz-Takamura-Kaneda** teaches the method of claim 11, further comprising issuing an interrupt instruction (*e.g. "if an interrupt request is in that port, an I/O interrupt for the VM monitor of the real machine will be generated,"* **from Kaneda in Col. 4, Lines 20-22**) from a device module (*e.g. "the device driver to be located,"* **from Bantz in [0006] Line 7**) of the plurality of device modules in the server platform (e.g. "*The device information is used to…find out if support for that particular device exists on the server,"* **from Bantz in [0027] Line 7 – [0028] Line 4**).

19. In regard to claim 17, **Bantz-Takamura-Kaneda** teaches the method of claim 11,wherein the interrupt instruction (e.g. "*an I/O interrupt,"* **from Kaneda in Col. 4, Lines 20-22**) further comprises a virtual machine identifier (e.g. "*identification number,"* **from Kaneda in Col. 1, Lines 63)** to identify a virtual machine in the client platform to handle the interrupt (*e.g. "By this handling routine…it is determined which virtual machine has issued the I/O instruction which caused the I/O interrupt,"* **from Kaneda in Col. 6, Lines 40-43**).

20. Claims 23-25 are corresponding machine readable storage medium claims (*see "HDD,"* **in Fig. 1 [903] [913],** *e.g. "In the HDD 903, there are stored an application program 121, an operating system 122, a hypervisor 123, and a boot loader 124,"* **from Takamura in [0028]**) of method claims 15-17; therefore, they are rejected under the same rational.

21. In regard to claim 26, **Bantz** teaches a system, comprising

a client platform (*see client platform*, **in Fig. 3 [104])** comprising:

determining (*e.g. "recognized,"* **in [0006] Line 3**) that an input/output operation related to a hardware device (*e.g. "plugged in,"* **in [0006] Lines 2-3**) happens in a virtual machine (*e.g. "the device to be detected locally, the device driver to be located, downloaded, and installed to the virtual machine,"* **in [0006] Lines 6-8**) and construct a request for the input/output operation (e.g. "*find out if support for that particular device exists on the server,"* **in [0028] Lines 3-4**);

a client network interface (*see inherent communication interface to communicate with server,* **in Fig. 3 [101] [104]**) to send the request through a network (*see sending and receiving via network,* **in Fig. 1)**; and the server platform (*see server platform*, **in Fig. 1 [101])** comprising:

a server network interface (*see inherent communication interface to communicate with client,* **in Fig. 3 [101] [104]**) to receive the request through the network (*e.g. "sends that information to the virtual machine instance in server…The device information is used to…find out if support for that particular device exists on the server,"* **in [0027] Line 7 – [0028] Line 4**);

a plurality of device modules (*e.g. "the device driver to be located*," **in [0006] Line 7**);

a controller to identify a device module from the plurality of device modules (*e.g. "the device driver to be located*," **in [0006] Line 7**) to handle the request (*e.g. "find out if support for that particular device exists on the server…If not, the virtual machine*

instance in the server initiates the installation of a physical device driver in the server," **in [0028] Lines 3-6**), the identified device module corresponding to the input/output device related to the input/output operation *e.g. "the device to be detected locally, the device driver to be located, downloaded, and installed to the virtual machine,"* **in [0006] Lines 6-8**), but

Bantz does not teach

a virtual machine monitor to determine that an input/output operation related to the input/output device happens during execution of an application on a virtual machine of a plurality of virtual machines as claimed.

However, **Takamura** teaches

a virtual machine monitor (*see "Hypervisor,"* **in Fig. 2 [123]**) to determine that an input/output operation related to the input/output device happens (e*.g. "hypervisor of the client computer…for detecting an access to an I/O device of the server computer…and…transmitting a command to the I/O device of the server computer….A hypervisor of the server computer…which receives the command to the I/O device from the network, and issues the command to the I/O device,"* **in [0010] Lines 4-14**) during execution of an application (*e.g. "The application program 121 is a program including file reading 210 and file writing 360, and it carries out reading and writing from/to the I/O device 914, which is connected to the server computer 102,"* **in [0029] Lines 1-4**) on a virtual machine (*see guest operating system ran in client,* **in Fig. 2 [122]**, *e.g. "The startup processing 320 is called when the client computer 101 is started and it activates the hypervisor and the OS,"* **in [0045] Lines 4-6**), and

Kaneda teaches

a plurality of virtual machines (*e.g. "virtual machines each given a different identification number,"* **from Abstract**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to combine **Bantz-Takamura-Kaneda** for reasoning set forth above in claim 4.

22. In regard to claim 27, **Bantz-Takamura-Kaneda** teaches the system of claim 26, wherein the request (e.g. "*find out if support for that particular device exists on the server,"* **from Bantz in [0028] Lines 3-4**) further comprises a device module identifier to identifier the device module in the server platform (*see inherent identification of server platform in connection of client to the server,* **from Bantz in Fig. 1 [101] [104]**).

23. In regard to the system of claim 28, **Bantz-Takamura-Kaneda** teaches wherein

the identified device module in the server platform is further to obtain a result (*e.g. "recognized,"* **from Bantz in [0006] Line 3**) for the input/output operation (*e.g. "the device to be detected locally,"* **from Bantz in [0006] Lines 6-8**), and construct a feedback with the result (*see installation as feedback, e.g.* "*downloaded, and installed to the virtual machine,"* **from Bantz in [0006] Lines 6-8**) and a virtual machine identifier (e.g. "*identification number,"* **from Kaneda in Col. 1, Line 63**) to identify the virtual machine in the client platform (e.g. "*computer system,"* **in Col. 1, Lines 63-65**) under

control from the controller (e.g. "*computer system for controlling virtual machines, each machine given a different identification number,*" **from Kaneda in Col. 1, Lines 63-65**),

and the server network interface (*see inherent communication interface to communicate with client,* **from Bantz in Fig. 1 [101] [104]**) is further to send the feedback to the client platform through the network (*see server sending the device driver through the network to the virtual machine on client,* **in Fig. 1**, *e.g.* "*downloaded, and installed to the virtual machine,*" **from Bantz in [0006] Lines 6-8**).

24. In regard to claim 29, **Bantz-Takamura-Kaneda** teaches the system of claim 26, wherein

the client network interface (*see inherent communication interface to communicate with server,* **from Bantz in Fig. 1 [101] [104]**) is further to receive a feedback for the input/output operation from the server platform through the network (*see server sending the device driver through the network to the virtual machine on client,* **in Fig. 1**, *e.g.* "*downloaded, and installed to the virtual machine,*" **from Bantz in [0006] Lines 6-8**); and

the virtual machine monitor (*e.g. "*the VM monitor*,"* **from Kaneda in Abstract**) is further to identify the virtual machine in the client platform that is executing the input/output operation (*e.g. "executes a program of the VM monitor…to transfer the control right of the CPU to one of the programs of the virtual machine regions…allocated for each virtual machine, so that one virtual machine may be operated,"* **from Kaneda in Col. 3, Lines 50-54**) based upon the feedback and send

the feedback to the identified virtual machine (*see installation as feedback, e.g.* "*downloaded, and installed to the virtual machine,"* **from Bantz in [0006] Lines 6-8**).

25. In regard to claim 30, **Bantz-Takamura-Kaneda** teaches the system of claim 26, wherein

a device module (*e.g. "the device driver to be located*," **from Bantz in [0006] Line 7**) in the server platform (e.g. "*The device information is used to…find out if support for that particular device exists on the server,"* **from Bantz in [0027] Line 7 – [0028] Line 4**) is to issue an interrupt instruction under control from the controller (*e.g. "if an interrupt request is in that port, an I/O interrupt for the VM monitor of the real machine will be generated,"* **from Kaneda in Col. 4, Lines 20-22**), the interrupt instruction including a virtual machine identifier to identify another virtual machine in the client platform to handle the interrupt instruction (*e.g. "By this handling routine…it is determined which virtual machine has issued the I/O instruction which caused the I/O interrupt,"* **from Kaneda in Col. 6, Lines 40-43**); and

the server network interface (*see inherent communication interface to communicate with client,* **from Bantz in Fig. 1 [101] [104]**) is further to send the interrupt instruction (e.g. "*I/O interrupt"* **from Kaneda in Col. 4, Lines 20-21**) to the client platform through the network (*see connection from server to client*, **from Bantz in Fig. 1 [101] [104]**).

26. In regard to claim 31, **Bantz-Kaneda** teaches the system of claim 30, wherein

the client network interface *see inherent communication interface to communicate with server,* **from Bantz in Fig. 1 [101] [104]**) is further to receive the interrupt instruction (*see connection from server to client*, **from Bantz in Fig. 1 [101] [104]**); and

the virtual machine monitor (*e.g. "the VM monitor,"* **from Kaneda in Abstract**) is further to identify the another virtual machine (*e.g. "By this handling routine…it is determined which virtual machine has issued the I/O instruction which caused the I/O interrupt,"* **from Kaneda in Col. 6, Lines 40-43**) from the plurality of virtual machines (*e.g. "virtual machines each given a different identification number,"* **from Kaneda in Abstract**) based upon the interrupt instruction and inject (*e.g. "By this handling routine," in Col. 6, Line 40*) the interrupt into the identified another virtual machine (*e.g. "By this handling routine…it is determined which virtual machine has issued the I/O instruction which caused the I/O interrupt,"* **from Kaneda in Col. 6, Lines 40-43**).

27. Claims 35-37 recite claims that contain substantially the same limitations of claims 14-16; therefore, they are rejected under the same rational.

28. In regard to claim 38, **Bantz-Takamura** teaches the method of claim 32, but **Bantz-Takamura** does not teach

wherein the interrupt instruction further comprising a virtual machine identifier to identify another virtual machine in the client machine to handle the interrupt instruction as claimed.

However, **Kaneda** teaches:

interrupt instruction (e.g. "*I/O interrupt*" **in Col. 4, Lines 20-21**) comprising a virtual machine identifier (*e.g. "identification number,"* **in Col. 6, Line 1**) to identify another virtual machine to perform the interrupt instruction (*e.g. "By this handling routine…it is determined which virtual machine has issued the I/O instruction which caused the I/O interrupt,"* **in Col. 6, Lines 40-43**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to combine **Bantz-Takamura** with **Kaneda** for reasoning set forth above in claim 4.

29. In regard to claim 39, **Bantz-Takamura-Kaneda** teaches the method of claim 38, further comprising:

receiving an interrupt instruction (*e.g. "if an interrupt request is in that port, an I/O interrupt for the VM monitor of the real machine will be generated,"* **from Kaneda in Col. 4, Lines 20-22**) through the network by the client platform (*e.g. "recognized,"* **from Bantz in [0006] Line 3**)

identifying the another virtual machine in the client platform based upon the interrupt instruction (*e.g. "By this handling routine…it is determined which virtual machine has issued the I/O instruction which caused the I/O interrupt,"* **from Kaneda in Col. 6, Lines 40-43**); and

injecting the interrupt instruction (*e.g. "By this handling routine," in Col. 6, Line 40*) into the identified another virtual machine (*e.g. "By this handling routine…it is*

determined which virtual machine has issued the I/O instruction which caused the I/O interrupt," **from Kaneda in Col. 6, Lines 40-43**).

30. Claims 13, 21, and 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bantz-Takamura in view of US 2005/0198303 A1 to Knauerhase et al. (hereinafter referred to as Knauer).

31. In regard to claim 13, **Bantz-Takamura** teaches the method of claim 11, but **Bantz-Takamura** does not teach

determining whether the identified device module is in another server platform; and

sending the request from the server platform to the another server platform via the network, in response to determining that the identified device module is in the another server platform as claimed.

However, **Knauer** teaches determining (*e.g. "the server determines if a virtual machine already exists that offers the service,"* **in Abstract**) whether the identified device module (*e.g. "service from the virtual machine,"* **from Abstract**) is in another server platform (*see plurality of servers hosting virtual machines,* **in Fig. 1 [125]**, *e.g. "server is coupled to carious other servers in server farm,"* **in [0020] Lines 1-2**); and

sending the request from the server platform to the another server platform via the network (*e.g. "see servers coupled together through network,"* **in Fig. 1**), in response to determining that the identified device module is in the another server

platform (e.*g. "the server determines if the requested service may be offered…the server switches, based on whether the requested service may be offered,"* **in [0047] Lines 11-14**).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the current invention to add the feature of determining an additional server to obtain a service for handling a request as disclosed in **Knauer**, into the teachings of **Bantz-Takamura**, since all of the references are directed to providing services to virtual machine operating system environments, hence, would be considered to be analogous based on their related fields of endeavor.

One would have been motivated to do so to add the additional benefit of having a backup server in case a primary server did not have the required software or was unable to fulfill a request in a desired way, as **Knauer** discloses the need for providing services to user's in different operating system environments (e.*g. "to offer other services requiring a different, incompatible hosting environment (e.g. different operating system or supporting environment software versions), the service provider has to configure another server with the other services…The invention addresses these problems and others in the art,"* **from Knauer in [0005] - [0006]**)

32. Claim 21 is a corresponding machine readable storage medium claim (*see "HDD,"* **in Fig. 1 [903] [913],** *e.g. "In the HDD 903, there are stored an application program 121, an operating system 122, a hypervisor 123, and a boot loader 124,"* **from**

Takamura in [0028]) of method claim 13; therefore, it is rejected under the same rational.

33. Claims 33-34 recite claims that contain substantially the same limitations of claim 13; therefore, they are rejected under the same rational.

Response to Arguments

35. In the Arguments/Remarks Applicant's argued in substance that:

(A) Bantz does not teach "determining that an input/output operation related to an input/output device happens during execution of an application on a virtual machine of the client platform," because the device virtualization layers is not the same as an operating system of the client. **(Page 16)**

(B) The user in **Bantz** does not run an application which actually runs on the virtual machine of the server. **(Pages 16-17)**

As to argument A, after reviewing the applicant's argument Examiner agrees with Applicants arguments.

As to argument B, Examiner believes that Applicant intended to state that "The user in **Bantz** does not run an application which actually runs on the virtual machine of the ~~server~~ **client**." However, since **Arguments A and B** are related, and the rest of the arguments are stated as being for similar reasons to **Arguments A and B**; Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

36. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 5,996,026 to Onodera et al.

US 6,418,464 B1 to Minow

US 2003/0090704 A1 to Hansen

US 2005/0076324 A1 to Lowell et al.

US 2003/0208642 A1 to Desai et al.

US 2005/0076155 A1 to Lowell

37. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

38. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JONATHAN WILLIS whose telephone number is (571)270-7467. The examiner can normally be reached on 8:00 A.M. - 6:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wing Chan can be reached on (571)272-7493. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JONATHAN WILLIS/
Examiner, Art Unit 2441
3/2/2010

/Wing F. Chan/
Supervisory Patent Examiner, Art Unit 2441